

KINGSTON WATER DISTRICT (PWSNO 1400030)
SOURCE WATER ASSESSMENT REPORT

December 13, 2000



State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for Kingston Water District*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Kingston Water District drinking water is supplied by a single well drawing from a shallow unconfined alluvial aquifer near Kingston, Idaho. The well is located in the floodplain of the Coeur d'Alene River. The source was classified as ground water under direct influence of surface water (GWUDI) after a microscopic particulate analysis of the water showed algae contamination of the water following flooding in 1995 and 1996. Water from the well is corrosive, causing leaching of copper in concentrations above the action level from the distribution system.

A Susceptibility Analysis conducted by DEQ November 22, 2000 ranked the Kingston Water District well highly susceptible to microbial contamination and moderately susceptible to contamination by inorganic chemicals, volatile organic chemicals and synthetic organic chemicals. Geologic characteristics of the well site, the shallowness of the well and the way it is constructed, rather than the presence of the various classes of potential contaminants in the well recharge area make the well vulnerable.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Source water protection activities for Kingston should focus first on maintaining the sanitary setback around the well. The GWUDI determination documented pastureland where cattle and horses are kept about 50 feet from the well. During periods of high water and heavy rain contaminants can leach directly into the shallow aquifer from the ground, so it is important for Kingston Water District to form partnerships with the state and local agencies and private landowners in the designated areas outside its direct jurisdiction to regulate land use over the well recharge area. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and local Soil Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies, please contact your regional Idaho Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR KINGSTON WATER DISTRICT

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted.

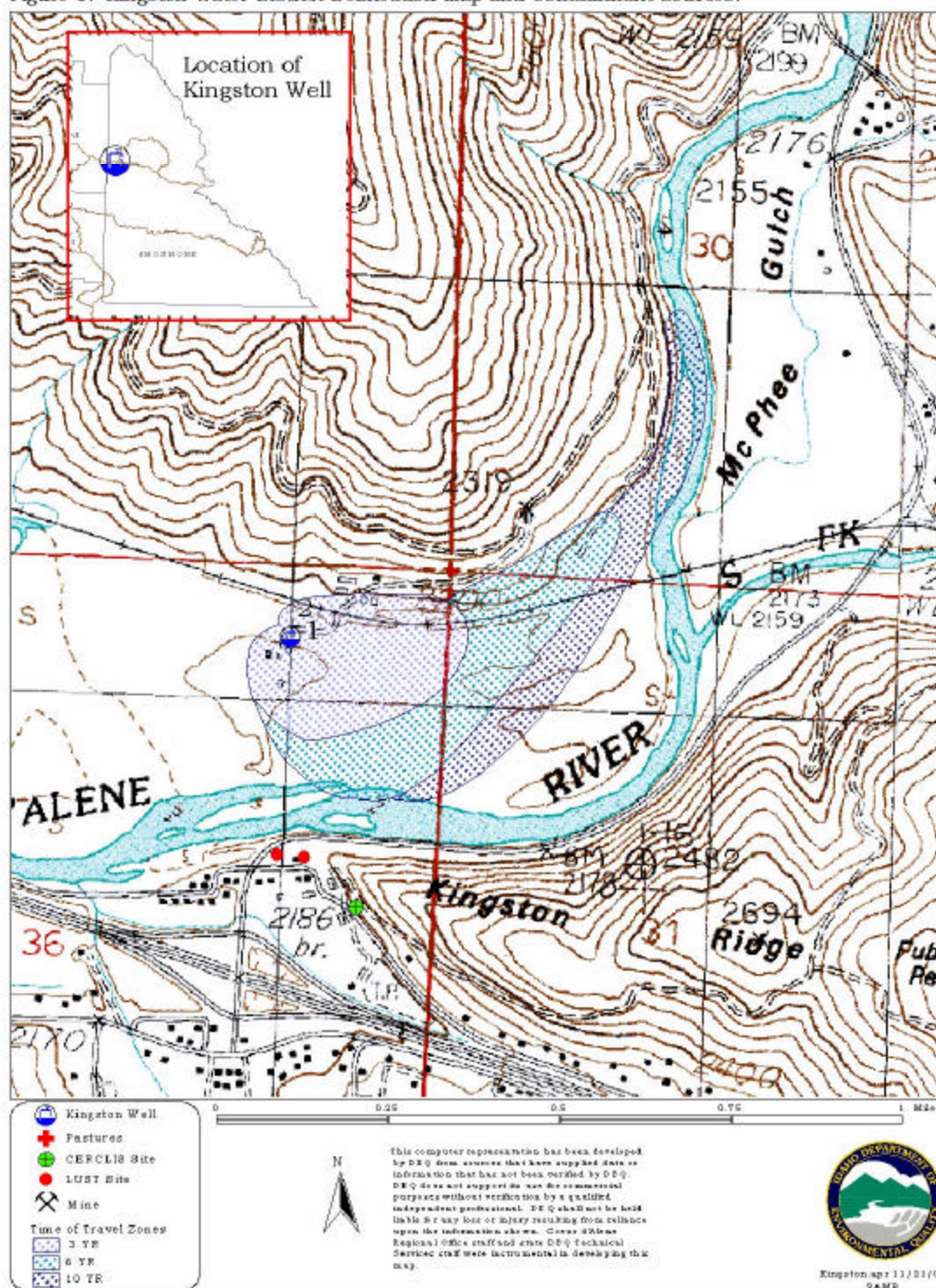
It is important to review this information to understand what the ranking of this source means. A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The scoring sheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Kingston Water District Delineation Map and Contaminant Sources.



Section 2. Conducting the Assessment

General Description of the Source Water Quality

Kingston Water District serves a community of approximately 800 people in and around Kingston, Idaho. (Figure 1). Public drinking water for the Kingston Water District is supplied from a shallow dug well in the flood plain of the Coeur d'Alene River north of Kingston

The primary water quality issue currently facing the Kingston Water District is that of microbial contamination and the problems associated with managing this contamination. The well was determined to be under the direct influence of surface water when microbial contamination of the well water followed periods of flooding in 1995 and 1996. The water from the well is also corrosive, causing leaching of copper from the distribution system.

Nitrates were detected in the water at concentrations between 0.088-mg/l and 0.85 mg/l between 1982 and 1993. The Maximum Contaminant Level (MCL) for nitrate is 10 mg/l. It has not been detected in annual tests since 1994. Radionuclides at concentrations below the MCL have been present in the water since testing began in 1980. Tetrachloroethylene (MCL = 5 µg/l) was present at a concentration of 3.8 µg/l in a sample tested in July 1993. A retest for the chemical in September 1993 was negative. Tetrachloroethylene can leach out of PVC pipes. The chemical is also a constituent of some septic tank cleaners.

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the three-year, six-year and ten-year time-of-travel (TOT) for water associated with the shallow unconfined alluvial aquifer in the vicinity of Kingston, Idaho. The computer model used site-specific data, assimilated by DEQ from a variety of sources including local well logs. The delineated source water assessment area for Kingston Water District is about a mile long and follows the curve of the main river valley from Enaville to Kingston. At its widest, the delineation reaches from the base of the hills north of Kingston to the river--about 0.3 of a mile (Figure 1). The data used by DEQ in determining the source water assessment delineation are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use inside the delineated area for the Kingston Water District well is undeveloped rural residential. The public water system file for the Kingston Water District indicates the presence pastureland to the north and east of the well. The well itself and most of the recharge area are in the 100-year flood plain of the Coeur d'Alene River.

It is important to understand that a release may never occur from a potential contaminant site, provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of ways that water systems can work cooperatively with owners of potential contaminant sites, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A contaminant inventory of the study area conducted by DEQ involved identifying and documenting potential contaminant sources within the Kingston Water District Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ. Sanitary surveys and other materials in the public water system file were consulted as well.

The only documented potential contaminant sites in the delineated area around the Kingston well are pastures for horses and cattle. Table 1 lists the potential contaminants of concern, time of travel zones, and information source. The location of the well, potential contaminants and time of travel zones are shown on Figure 1.

Table 1. Kingston Water District Potential Contaminant Inventory

SITE #	Source Description	TOT Zone ¹ (years)	Source of Information	Potential Contaminants
1	Pasture	*Sanitary Setback	PWS File	Microbial
2	Pasture	3 YR	PWS File	Microbial

¹ TOT = time of travel (in years) for a potential contaminant to reach the wellhead

* Sanitary setback or well lot required for public drinking water wells is a 50 foot radius around the well

Section 3. Susceptibility Analyses

The susceptibility of the sources to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was high for the Kingston Water District Well (Table 2). This reflects the nature of the shallow, unconfined aquifer, and the alluvial soils at the well site, which offer little resistance to the transport of contaminants from the surface to the water table.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a system that can better protect the water. The Kingston Water District well got a high construction score because it is only 17 to 25 feet deep, and is located in the 100 year flood plain of the Coeur d'Alene River. The well was apparently dug and there are no records on file with DEQ showing casing and surface seal details, soil strata, and static water level.

Potential Contaminant Source and Land Use

The Kingston Water District well was automatically ranked highly susceptible to microbial contamination on the basis of water sampling results in 1995 and 1996 and also because livestock are kept in a pasture that impinges on the sanitary setback for the well. Potential Contaminant/land use scores for the IOC, SOC and VOC classes of contaminants were low since there is little residential development and no commercial or industrial development documented in the source water protection zone.

Final Susceptibility Ranking

Table 2 shows the final susceptibility scores for the Kingston Water District well. As explained above, the high susceptibility to microbial contamination is an automatic ranking. The well is ranked moderately susceptible to IOC, SOC and VOC contamination. Well construction and hydrologic sensitivity scores added all the points to these rankings. The Susceptibility Analysis worksheet for the Kingston Water District well is attached to this report.

Table 2. Summary of Kingston Water District Susceptibility Evaluation

Well	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
L	H	L	L	L	H*	H	M	M	M	H*

¹H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

²H* - Indicates source automatically scored as high susceptibility due to presence of Bacteria, a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. While DEQ recognizes the intent of Kingston Water District to join Central Shoshone County Water District after the Enaville well comes on line, there are some simple measures that can be implemented in the meantime. For the Kingston Water District, source water protection efforts should focus first on maintaining a fenced perimeter around the well to exclude livestock and wildlife since the aquifer is susceptible to surface contaminants leaching downward during periods of heavy rains or flooding. The district needs to establish partnerships with private landowners, especially in the three year time of travel zone outlined on Figure 1, to regulate use and storage of potential contaminants over the well recharge area. The county planning and zoning ordinances should be reviewed to see what ground water protection tools are available already or need to be implemented. Source water protection activities for agriculture should be coordinated with the Idaho Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resource Conservation Service.

Assistance

Public water supplies and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional IDEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 343-7001 for assistance with wellhead protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality, 2000. Protecting Drinking Water Sources in Idaho.

Idaho Department of Environmental Quality, 2000. Hydrogeologic Summary of Time of Travel Capture Zones for Public Water sources in the silver Valley/Coeur d'Alene River Hydrogeologic Province.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality, 2000. City of Fruitland Wellhead Viability Project 319 Grant Final Report July 2000.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Attachment A

Kingston Water District Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

> 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name : **KINGSTON WATER DIST 1**

Source: **WELL**

Public Water System Number : **1400030**

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1. System Construction		SCORE			
Drill Date					
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	0			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	NO	1			
Total System Construction Score		5			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A (Sanitary Setback)	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES*	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use -3 Yr. TOT					
Contaminant sources present (Number of Sources)	YES	0	0	0	2
(Score = # Sources X 2) 8 Points Maximum		0	0	0	4
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score 3 YR TOT		0	0	0	4
Potential Contaminant / Land Use -6 YR TOT					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant / Land Use - 10 YR TOT					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score -10 YR TOT		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		0	0	0	4
4. Final Susceptibility Source Score		11	11	11	13
5. Final Well Ranking		Moderate	Moderate	Moderate	High*

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as **Superfund** is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.